1.0 INTRODUCTION

Floods inflict more damage and economic losses on the United States than any other type of natural disaster. During the 10 years from fiscal year (FY) 92 through FY01, flooding caused more than 900 deaths and inflicted in excess of $55 billion in damages. For decades, the national response to flood disasters generally was limited to flood control works such as levees and dams, and providing disaster relief to flood victims. This approach neither reduced losses nor discouraged unwise development. In fact, in some instances, it actually may have encouraged additional development. To compound the problem, the public often could not buy flood coverage from insurance companies, and building techniques that could reduce flood damage often were overlooked. In the face of mounting flood losses and escalating disaster relief costs to the general taxpayer, the U.S. Congress created the National Flood Insurance Program (NFIP).

The MHIP is a roadmap that defines how FEMA will produce updated, digital flood-hazard data with multi-hazard applications.

The Federal Emergency Management Agency (FEMA) is the Federal agency with primary responsibility for assisting local and state governments, private entities, and individuals in preparing for, mitigating, responding to, and recovering from natural disasters, including floods. The NFIP is the key component of FEMA's efforts to minimize or mitigate the damage and financial impact of floods on the public, and to limit Federal expenditures needed after floods occur.

The NFIP's objectives are to reduce flood damages and provide an insurance mechanism for those most in need of protection. To that end, FEMA has been identifying and assessing flood hazards, providing Special Flood Hazard Area (SFHA) information on maps, and setting national floodplain management requirements that are adopted and enforced by communities choosing to participate in the NFIP. Minimizing the flood risk for new and existing development has protected citizens' lives, property, and personal finances.

Currently, many people within the United States live along streams, coasts, or lakes for which flood hazards have not been identified on maps, or where the maps are dated and do not accurately portray the flood hazards. The flood hazard map panel inventory needs to be updated. With presidential and congressional support and anticipated 5 years of funding (FY04-FY08), FEMA has embarked on an effort to update the Nation's flood maps through Multi-Hazard Flood Map Modernization (Map Modernization). The Multi-Year Flood Hazard Identification Plan (MHIP) is a roadmap that defines how FEMA will produce updated, digital flood-hazard data with multi-hazard applications for the United States.

1.1 MHIP Benefits

FEMA currently has an inventory of more than 90,000 flood insurance rate map (FIRM) panels (including index panels) in various formats. With congressional support, FEMA now anticipates

the funding to produce updated digital data for a much more significant portion of the United States.

The complexity of this task requires a detailed plan for performance, schedule, and cost. This MHIP presents FEMA's initial plan for accomplishing the digital flood insurance rate map (DFIRM) production activities of Map Modernization. The MHIP provides:

- A 5-year (FY04-FY08) sequence for nationwide DFIRM production, based on the planned $1.475 billion Map Modernization budget
- A planning tool to enable all stakeholders to anticipate future workload requirements such as new flood zone determinations and ordinance adoptions
- A long-term vision to support the decision-making processes of local, state, and regional community partners
- A flexible tool that will allow FEMA and its partners to balance national goals and local mapping needs
- An input process that maximizes stakeholder involvement and clear communication (to maintain stakeholder awareness of the planning effort and encourage participation and contributions by partners)
- A methodology for equitable funding distributions
- Initial planned costs and schedules for current and future map updates for counties, parishes, independent cities, and territories nationwide
- A dynamic method to revise scheduling for flood map production for studies funded through FY08 (completed through FY10)
- A mechanism for clear reporting of progress for greater accountability
- An approach for establishing, based on the level of risk, the appropriate level of detail, accuracy, and analysis required to produce reliable maps (see section 7)
- A process for continuous improvement through implementation of cost-saving methods and study/mapping process enhancements that will allow map production to proceed in the most cost-efficient manner
- An infrastructure framework and resource investment that will allow for a risk management approach to multi-hazard information in the future

1.2 National Flood Insurance Program Background

Congress established the NFIP with the passage of the National Flood Insurance Act of 1968. The NFIP is a Federal program that enables property owners in participating communities to purchase insurance as a protection against flood losses, in exchange for state and community commitments to establish and implement floodplain management regulations targeted at reducing future flood damages.

Participation in the NFIP is voluntary and based on an agreement between communities and the Federal government. If a community adopts and enforces a floodplain management ordinance to reduce future flood risk to new construction in floodplains, the Federal government makes flood insurance available within the community. This insurance provides an alternative to disaster assistance and reduces the taxpayer burden of escalating costs for repairing flood damage to buildings and their contents by sharing the risk among policyholders.

Since its inception, the NFIP has sought to minimize flood-related property losses by making flood insurance available on reasonable terms and encouraging its purchase by people who need insurance protection—particularly those living in areas having highest risk of flooding, known as special flood hazard areas (SFHAs), areas subject to inundation by the base (1-percent-annual-chance) flood. The NFIP identifies and maps flood-prone areas, makes flood insurance available to property owners in the more than 20,000 communities that currently participate in the program, and requires participating communities to enact floodplain management measures to mitigate flood hazards. In the early 1990s, FEMA began to collect data and information to develop flood maps in digital format. In 1994, the President issued Executive Order 12906, which mandated that standards for digital geographic data be applied uniformly throughout the Federal government. Anticipating that electronic data would soon become the standard vehicle for information delivery, and in an attempt to make flood map production more cost-effective and efficient, FEMA developed a prototype digital flood map.

In 1997, FEMA developed its initial Flood Map Modernization Plan, outlining the steps necessary to update the Nation's flood maps in digital format. The plan also suggested ways to streamline FEMA's efforts to raise public awareness of the importance of the maps and respond to requests for map revisions. In implementing the modernization plan, FEMA was able to provide more accurate and extensive flood hazard information, resulting in safer communities and flood insurance commensurate with actual risk. In 2002, FEMA updated the Flood Map Modernization Plan in response to the growing need and demand for updated flood maps. This updated plan reflects the recommendations of the 1995-2000 Technical Mapping Advisory Council created by Congress. When FEMA joined the Department of Homeland Security (DHS), the former Flood Map Modernization Plan expanded to Multi-Hazard Flood Map Modernization, broadening the scope of risk management from a single-hazard (flood) focus to a multi-hazard focus.

Recognizing the connection between damage reduction and accurate flood hazard maps, Congress appropriated significant funding for Map Modernization through the creation of a Map Modernization Fund, appropriating $15 million in FY01, $25 million in FY02, $150 million in FY03, $200 million in FY04, and $200 million in FY05. The substantial increase in funding reflects the priority and commitment that the President and Congress have placed on Map Modernization.

1.3 Purpose and Need for Map Modernization

Some of the flood maps in FEMA's inventory do not accurately reflect the true flood hazard risks. FEMA needs to modernize its maps for four primary reasons:

- New development and storm impact may change the physical environment such that the actual risks are no longer depicted on the flood maps.
- Better data is available, including topography, rainfall, gages, and other sources.
- New methods and models are available, providing more accurate predictions.
- Many areas have never been mapped.

The age distribution of the current nationwide map inventory is shown in figure 1-1. However, most of the engineering analyses contained within the studies may be significantly older than the date on the maps; the true percentage of outdated maps likely is greater than that shown in the pie chart.

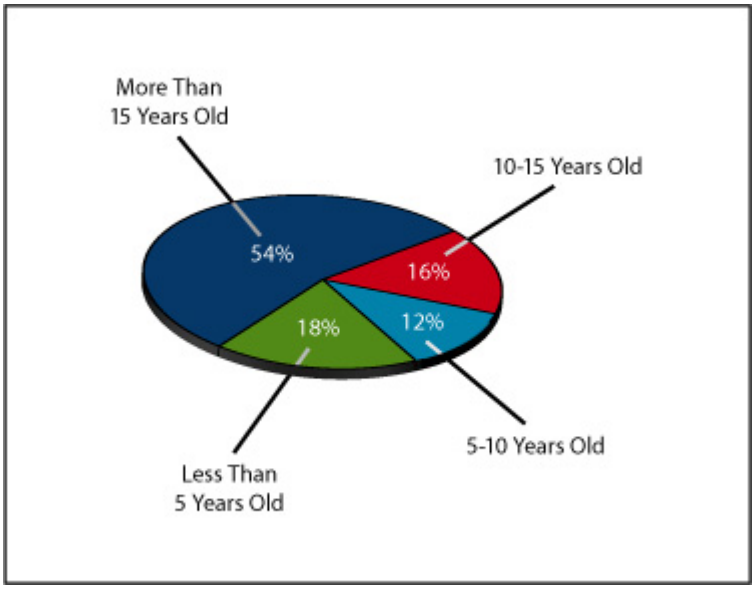


Figure 1-1. Age Distribution of the Current Nationwide Map Inventory (As of 2004)

Through Map Modernization, FEMA intends to produce more accurate and accessible flood maps by using advanced technology to gather accurate data and to make the resulting information available via the Internet.

As flood hazard data is updated, the flood map inventory becomes a digital map system enabling officials at all levels of government to assess risks using geographic information systems (GIS)-based technology and data. This technology will increase awareness of flood hazards and access to flood data through electronic viewing, ordering, and distribution of maps. Building capability with local communities and state partners will enable FEMA to grant states' requests to maintain their flood data.

Although the flood hazard data FEMA develops will be used specifically for floodplain management, the data also will have applications for multi-hazard purposes. FEMA's initial focus is on flood hazard data; funding was specifically allocated for flood maps. However, the framework data and infrastructure developed by Map Modernization also is expected to help local, state, and Federal officials mitigate and manage risk from multiple hazards, both natural and manmade. Accurate digital maps can provide more precise data to state and Federal officials on such factors as the location of hazardous material facilities, power plants, railroads, and airports for planning development and assessing internal weaknesses and evacuation routes.

Map Modernization will impact millions of citizens nationally. FEMA's flood maps serve the nation for insurance and flood disaster mitigation and relief. In 2002, industry experts reported more than 30 million uses of the flood maps by lenders and insurance agents. Flood hazard maps impact some 2 million development permits issued for new structures each year, and all federally regulated mortgages issued require that flood hazard maps be consulted. Map Modernization will result in safer communities by providing more accurate, readily available, and easier-to-use flood maps and data for communities nationwide.

Through Map Modernization, FEMA will:

- Network the Nation using Internet portal technology to provide access to general flood hazard, risk, and mitigation information. The information and functionality will be tailored to meet the needs of mapping partners, stakeholders, and the general public.
- Maximize the use of local, state and Federal resources, and transfer ownership and use of maps and data to the states and localities by building and maintaining effective partnerships with community, state, and regional entities before and during the development of maps and data. FEMA already has experienced considerable success with such transfers through the Cooperating Technical Partners (CTP) program.
- Reduce the processing time and cost for map updates and increase accountability for spending by implementing results-oriented systems and standards that will facilitate the rapid exchange of data between partners, stakeholders, FEMA staff, FEMA contractors, and other users.
- Communicate with partners, stakeholders, and users effectively, consistently, and continuously to maximize understanding of flood hazards and the risks that these hazards pose to life and property.
- Continue to improve the quality and accuracy of national flood-hazard data by developing GIS-based products with reliable technologies that meet enhanced technical standards.

1.4 Map Modernization Objectives

FEMA's long-term objective for Map Modernization is for the entire U.S. population to have reliable digital flood hazard data and maps for flood-prone areas.

The stated objectives of Map Modernization are as follows:

1. **Establish and maintain a premier flood-hazard data collection and delivery system**. FEMA will create a state-of-the-art, geospatial system that collects and maintains the best data available, integrates it into a national flood-layer theme, and provides easy access to reliable flood-hazard data and other information to support risk management applications and operations.

2. **Build and maintain mutually beneficial partnerships.** FEMA will foster mutually beneficial partnerships that achieve shared outcomes through the communication of flood risk and other hazards, and by improving the systems that support them. Partnerships result in enhanced delivery of risk management applications and operations. Map Modernization includes innovative local, state, and Federal partnerships that use advanced technologies for determining and depicting flood hazards. Map Modernization also includes improving E-Government processes for flood-hazard data collection and distribution. Through this objective, FEMA intends to maximize the reuse of existing data and cost sharing in the collection of new data with local, state, and Federal partners.

3. **Achieve effective program management.** FEMA will develop and provide a sound program management structure that motivates partners to share responsibilities and aligns with partners' missions to reduce the Nation's vulnerability to floods and other hazards. FEMA will develop and manage data quality standards and product specifications in a way that minimizes the complexity of the standards while maximizing interoperability of the data and systems.

4. **Expand and better inform the user community.** FEMA will foster public and stakeholder understanding of where to obtain flood and other hazard data, and how to use and analyze it in order to make sound decisions to reduce their vulnerability to natural and manmade hazards.

1.5 Map Modernization Performance

FEMA's Key Performance Parameter (KPP) for Map Modernization measures the percentage of the population whose safety is improved through the availability of accurate flood risk data in GIS format. Ultimately, FEMA plans to increase the safety for at least 85 percent of the U.S. population through availability of accurate flood risk data in GIS format. This goal is reflected in FEMA's overall performance parameter for Map Modernization, as shown in table 1-1.

Table 1-1. Map Modernization Key Performance Parameter

Parameter	Threshold	Objective
% of the population whose safety is improved through availability of accurate flood risk data in GIS format	85%	100%

Table 1-2 lists the annual targets for each of the supporting key performance indicators (KPIs). The targets began in FY04, the first year of full funding. The KPIs are national KPIs. Some regional statistics may exceed these KPIs and others may fall short; however, all regional statistics will roll up to the national KPIs. Section 6, Production Analysis, presents actual and projected achievement for each of these KPIs, from current status through projected status for FY10.

Table 1-2. Map Modernization Key Performance Indicators

Key Performance Indicators		Targets					
KPIs	Management Indicators	FY04	FY05	FY06	FY07	FY08	FY09
KPI 1	% of population with digital GIS flood data available on-line	20%	50%	65%	75%	85%	97%
KPI 2	% of population with adopted maps that meet quality standards	10%	20%	35%	50%	70%	90%
KPI 3	Leveraged digital GIS flood data	20%	20%	20%	20%	20%	20%
KPI 4	% of appropriated funds sent to CTPs	20%	25%	33% *	33% *	33% *	33% *

Note: KPIs 1 and 2 are cumulative; KPIs 3 and 4 are annual

* These targets for FY06-FY09 depend on the ability to develop state and local capability. There are significant assumptions in KPI 4 and FEMA is examining strategies to increase the target numbers.

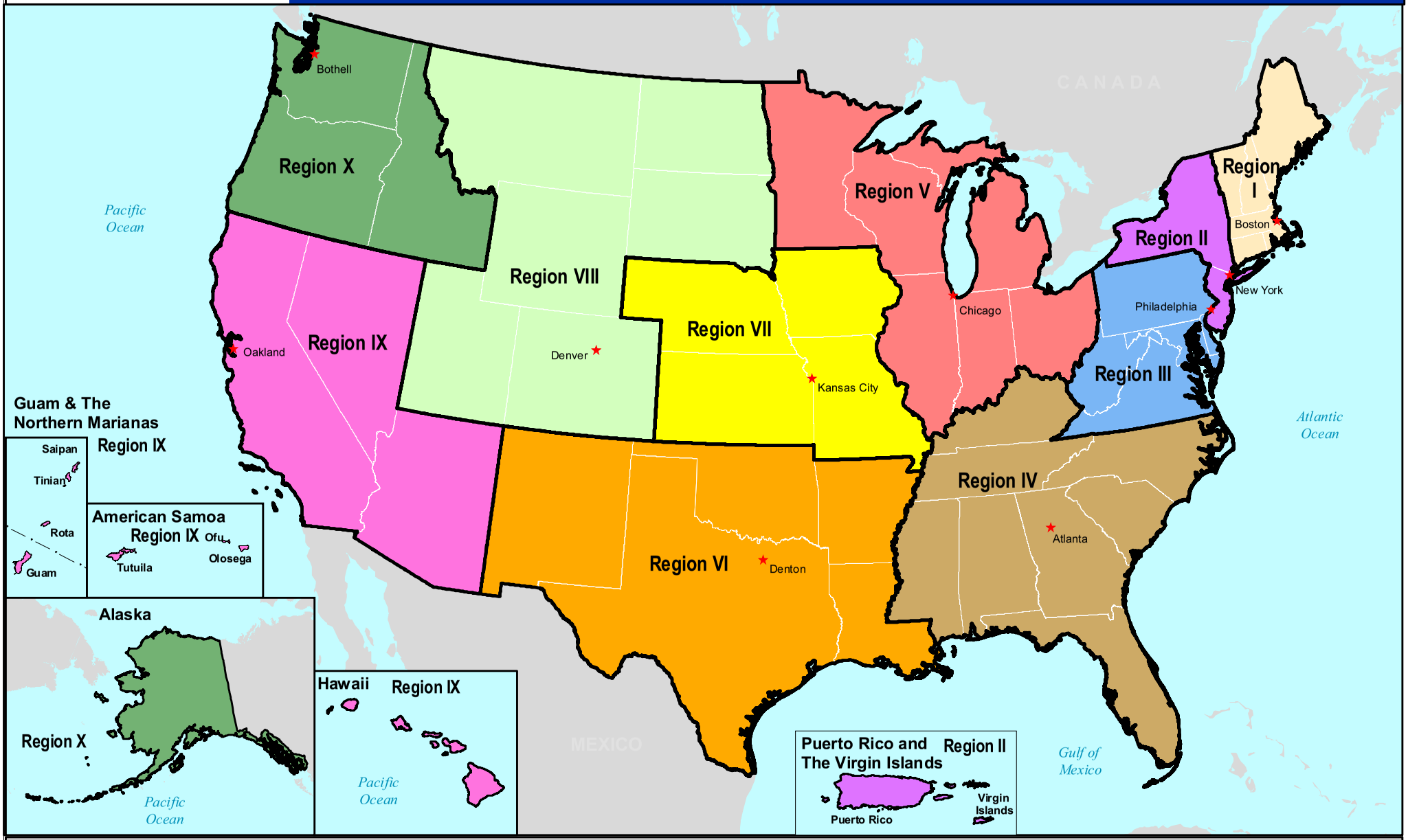
1.6 Map Modernization Framework

FEMA developed a program framework around the President's total budget of $1.475 billion for Map Modernization, which includes four primary categories of activities: engineering and mapping; ongoing technical support, system, and tools development; customer care and outreach efforts; and program management support. These categories represent Map Modernization's work breakdown structure (WBS) that constitutes the basis for budget, schedule, and performance baselines.

Map production costs are captured primarily under category 1, Engineering and Mapping. However, map production costs are only a portion of category 1 costs (this category also includes map maintenance, the development of methodologies and standards, needs assessment, library data management, and other activities), so the budget for this category does not directly correspond to FEMA's budget for map production in the Regions.

The spending per cost category may change during the planning period, as Map Modernization changes and funds are divided differently among the four WBS categories. For example, as more studies are completed, the allocated funds may shift away from map production toward hazard data maintenance. If that happens, this plan will have to change to reflect the change in dollars available for map production. Changes may affect distribution to FEMA's Regions, which are shown in map 1-1, and the funding for the individual studies.

Map 1-1. FEMA Regions



MHIP

Miles
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Projection: North America Albers Equal-Area Conic
Data Source: FEMA

Section 3 provides a detailed description of the WBS categories and the actual Map Modernization budgets for FY03 through FY05 and estimated budgets for FY06 through FY08 for these categories, focusing on map production.

1.7 MHIP Process

1.7.1 Collaborative Process for a Plan Developed by FEMA and Stakeholders

The MHIP provides all mapping partners with a 5-year plan for map production, based on anticipated funding through FY08. The plan reflects proposed or estimated annual budget allocations, state and Regional Office business plans, changing study and mapping needs, and new data and technology.

The MHIP provides a rolling, five-year plan for initiating flood map updates for the entire nation within the President's budget and within five years.

Section 2 presents the MHIP process, showing the planned annual cycle of stakeholder inputs, appropriations, and MHIP updates. Communication is critical to the development, flexibility, and continual updating of the MHIP. Communication facilitates the proper identification of flood hazard risks and the proper allocation of funds to provide the appropriate method of engineering study for the level of risk in each community. The MHIP process and successful communication thus will provide each community in the Nation with quality map products. FEMA will refine the plan annually by integrating community data along with mapping needs identified by states, Regional Offices, and the National Office.

1.7.2 Flexible Plan Allows Regular Updates to Adapt to Changing Conditions

The concept of a rolling 5-year plan is not new. In general, the MHIP process is modeled after the successful Transportation Improvement Plan (TIP) process of the Federal Highway Administration. Metropolitan areas develop TIPs to determine how Federal fund allocations will be spent on various projects. These TIPs are then aggregated at the state level. Since budgets, needs, and priorities may change from one year to the next, it is not uncommon for the TIP to have a project scheduled to be done in 3 years, only to have it delayed or scheduled earlier in the following year's TIP.

This MHIP also allows updates to plans at the local level, as FEMA continues to respond to changes at state and local levels. FEMA expects to similarly re-evaluate and, as needed, re-sequence the map production projects as better information becomes available and budgets and needs change.

1.7.3 Plan Development and Updates

The foundations for this plan are state business plans and relative flood risk. In developing the initial MHIP, FEMA first assessed risk at the national level. FEMA used the overall picture of risk for the Nation to determine the allocation of funding by Region. FEMA's Regional Offices assessed risk and need at the regional level. State business plans, regional plans for Map Modernization, and other input were considered in developing the sequencing at the Regional level. Funding was determined for individual studies within the overall $1.475 billion anticipated. The Regional Offices and communities will further address specific local needs during the scoping process. These local needs also are submitted to FEMA's National Office via the ensuing state business plans. FEMA posted the MHIP on the Flood Hazard Mapping section of FEMA's Web site for stakeholder viewing, with instructions for stakeholders to submit comments on the plan (see section 2, Stakeholder Input). Table 1-3 defines the process for planning updates.

Table 1-3 MHIP Process

Timing	Planning Activities
Fall 2004	Release FY04-FY08 MHIP
Fall-Winter 2004	Business Planning Stakeholder Input
Winter 2004-5	Update Sequencing Revise MHIP
Spring 2005	Release Draft FY05-FY09 MHIP
Summer 2005	Stakeholder Input Update Sequencing
Fall 2005	Revise MHIP Release FY05-FY09 MHIP

1.8 Time Period Addressed by this MHIP

This plan addresses flood hazard study and map updates initiated in FY04-FY08. Flood hazard study production and map adoption by communities takes more than one year to complete. Therefore, the plan includes time periods falling between FY03 and FY10. References to these periods are, in general, related to flood hazard study production and map adoption timeframes, budget, the 5-year sequencing plan, the KPIs, or performance.

- Five-year planning period: The 5-year plan references this document presenting the five-year sequencing of studies planned for funding and initiation from FY04 through FY08. The spring 2005 document will be the Draft Plan for FY05-FY09.
- Map Modernization funding period: Map production for the nation is initiated through FY08. Some Map Modernization studies were funded in FY03 and have already begun; these therefore are not part of the 5-year plan, although FY03 studies do factor in budget discussions relative to the overall program. MHIP provides detailed tables and graphs of projected flood map production sequencing and projected funding allocations, based on the President's proposed budget, at the county level. Actual funding levels for county flood

map updates are determined as flood mapping projects are scoped and projects are further defined.

- Map Modernization production period: Studies funded through FY08 are scheduled to continue through FY10. Typically, studies are scheduled as preliminary and effective in consecutive subsequent years. That is, a flood hazard study that is initiated in one year will be delivered to the community as a preliminary flood hazard study and map the following year, and adopted by the community the year after that. Therefore, the production period began in FY03 and extends 2 years beyond the last funding year, to FY10 when all maps are scheduled to be adopted.
- Map Modernization KPI reporting period: The plan reports on actual and projected progress toward achieving Map Modernization's four KPIs, which have been defined for FY04 through FY09.

1.9 Organization of this Plan

The other sections of this plan are organized and focused as follows:

- Section 2, Stakeholder Input: This section summarizes findings from the state and regional plans and describes how additional data will be collected and used to refine sequencing and funding distributions and how stakeholders, partners, and users will be kept informed about MHIP updates.
- Section 3, Distribution of Funds to the Regions: This section presents the FY03 funding distribution factors, how they were used to determine the program phasing for the counties, and how final distributions were made based on other factors. The section also describes the use of sequencing as a tool in the distribution of funds. Finally, the section discusses recommended changes to the FY03 funding distribution factors for FY05 distribution of funds and other possible FY06 sequencing considerations.
- Section 4, FY04 Production Report: This section provides the current status of project goals, presents the sequencing tool, and defines how it is used and what information it provides. This section also presents the levels of funding for FY03 and FY04, describes how the actual performance compares to the national goals, and summarizes the overall progress to date.
- Section 5, FY05-FY10 Production Forecast: This section presents FEMA's sequencing of studies within regions, and describes what has been done to analyze the sequencing of regional studies in terms of meeting the national goals.
- Section 6, Production Analysis: This section presents goals, analysis of goals, and recommendations for FY05 through FY10.

- Section 7, Level of Study and Level of Risk: This section discusses FEMA's plan for linking the type of study for a community to their flood risks to provide reliable maps for all within the current budget.
- Section 8, Cost-Saving Processes, Procedures, and Tools: This section presents cost-saving procedures, processes, and tools being implemented by FEMA that have the potential to reduce study costs by as much as 50 percent.
- Section 9, Natural and Technological Hazards: Building on the National Flood Layer: This section presents the multi-hazard initiatives for building on the National Flood Layer of data developed by Map Modernization.
- Section 10, MHIP Updates: This section restates FEMA's effort moving forward to continue to refine the MHIP.